

REMARKS

5 Applicants submit that the amendment to the claims does not introduce new matter
and are fully supported by the specification and claims as originally filed. Applicants
submit that the present claims meet all the requirements for patentability. The Examiner is
respectfully requested to allow all the present claims. If the Examiner is of a contrary
view, the Examiner is requested to contact the undersigned attorney at (215) 557-3861.

10 Attached hereto is a marked-up version of the changes made to the specification
and the claims by the current amendment. The attached page is captioned "Version with
Markings to Show Changes Made."

Respectfully submitted,

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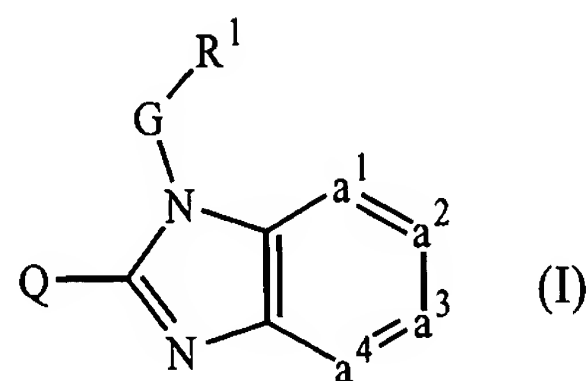
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VERSION WITH MARKINGS TO SHOW CHANGES MADEIn the claims:

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1. A compound of formula



a prodrug, N-oxide, addition salt, quaternary amine, metal complex or stereochemically isomeric form thereof wherein

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$-a^1=a^2-a^3=a^4-$ represents a bivalent radical of formula

$-\text{CH}=\text{CH}-\text{CH}=\text{CH}-$ (a-1);

$-\text{N}=\text{CH}-\text{CH}=\text{CH}-$ (a-2);

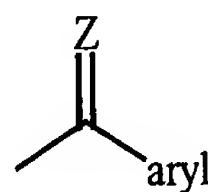
$-\text{CH}=\text{N}-\text{CH}=\text{CH}-$ (a-3);

$-\text{CH}=\text{CH}-\text{N}=\text{CH}-$ (a-4); or

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$-\text{CH}=\text{CH}-\text{CH}=\text{N}-$ (a-5);

wherein each hydrogen atom in the radicals (a-1), (a-2), (a-3), (a-4) and (a-5) may optionally be replaced by halo, C_{1-6} alkyl, nitro, amino, hydroxy, C_{1-6} alkyloxy, polyhalo C_{1-6} alkyl, carboxyl, amino C_{1-6} alkyl, mono- or di(C_{1-4} alkyl)amino C_{1-6} alkyl, C_{1-6} alkyloxycarbonyl, hydroxy C_{1-6} alkyl, or a radical of formula

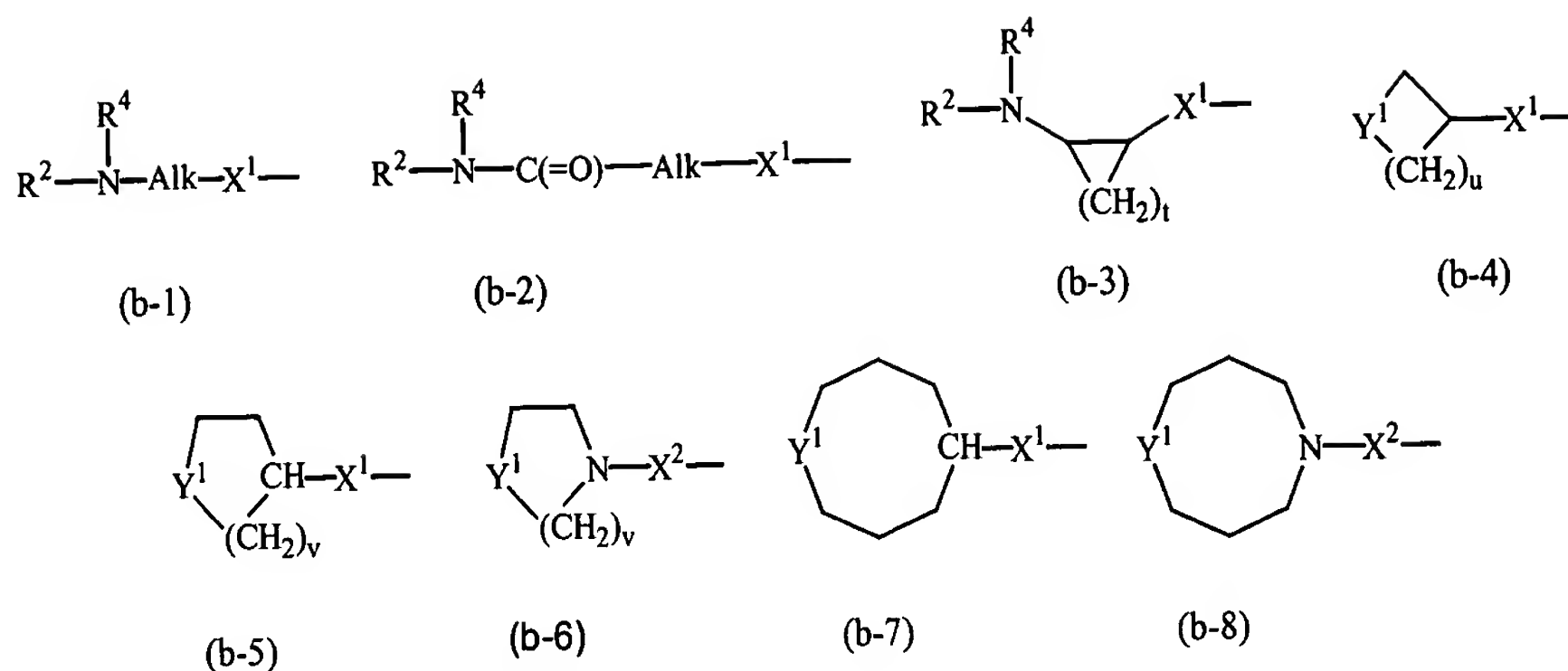


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wherein $=\text{Z}$ is $=\text{O}$, $=\text{CH}-\text{C}(=\text{O})-\text{NR}^{5a}\text{R}^{5b}$, $=\text{CH}_2$, $=\text{CH}-\text{C}_{1-6}\text{alkyl}$, $=\text{N}-\text{OH}$ or $=\text{N}-\text{O}-$

$\text{C}_{1-6}\text{alkyl}$;

Q is a radical of formula



wherein Alk is C₁₋₆alkanediyl;

Y¹ is a bivalent radical of formula -NR²- or -CH(NR²R⁴)-;

X¹ is NR⁴, S, S(=O), S(=O)₂, O, CH₂, C(=O), C(=CH₂), CH(OH), CH(CH₃), CH(OCH₃), CH(SCH₃), CH(NR^{5a}R^{5b}), CH₂-NR⁴ or NR⁴-CH₂;

X² is a direct bond, CH₂, C(=O), NR⁴, C₁₋₄alkyl-NR⁴, NR⁴-C₁₋₄alkyl;

t is 2, 3, 4 or 5;

u is 1, 2, 3, 4 or 5;

v is 2 or 3; and

whereby each hydrogen atom in Alk and the carbocycles and the heterocycles defined in radicals (b-3), (b-4), (b-5), (b-6), (b-7) and (b-8) may optionally be replaced by R³; with the proviso that when R³ is hydroxy or C₁₋₆alkyloxy, then R³ can not replace a hydrogen atom in the α position relative to a nitrogen atom;

G is C₁₋₁₀alkanediyl substituted with one or more hydroxy, C₁₋₆alkyloxy, arylC₁₋₆alkyloxy, C₁₋₆alkylthio, arylC₁₋₆alkylthio, HO(-CH₂-CH₂-O)_n-, C₁₋₆alkyloxy(-CH₂-CH₂-O)_n- or arylC₁₋₆alkyloxy(-CH₂-CH₂-O)_n-;

R¹ is a monocyclic heterocycle or aryl; said heterocycle being selected from piperidiny, piperaziny, pyridyl, pyraziny, pyridaziny, pyrimidiny, furanyl, tetrahydrofuranyl, thienyl, pyrrolyl, thiazolyl, oxazolyl, imidazolyl, isothiazolyl, pyrazolyl, isoxazolyl, oxadiazolyl; and each heterocycle may optionally be substituted with 1 or where possible more, such as 2, 3 or 4, substituents selected from halo, hydroxy, amino, cyano, carboxy, C₁₋₆alkyl, C₁₋₆alkyloxy, C₁₋₆alkylthio, C₁₋₆alkyloxyC₁₋₆alkyl, aryl, arylC₁₋₆alkyl, arylC₁₋₆alkyloxy, hydroxyC₁₋₆alkyl, mono- or di(C₁₋

₆alkyl)amino, mono-or di(C₁₋₆alkyl)aminoC₁₋₆alkyl, polyhaloC₁₋₆alkyl, C₁₋₆alkylcarbonylamino, C₁₋₆alkyl-SO₂-NR^{5c}-, aryl-SO₂-NR^{5c}-, C₁₋₆alkyloxycarbonyl, -C(=O)-NR^{5c}R^{5d}, HO(-CH₂-CH₂-O)_n-, halo(-CH₂-CH₂-O)_n-, C₁₋₆alkyloxy(-CH₂-CH₂-O)_n-, arylC₁₋₆alkyloxy(-CH₂-CH₂-O)_n- and mono-or di(C₁₋₆alkyl)amino(-CH₂-CH₂-O)_n;

5 each n independently is 1, 2, 3 or 4;

R² is hydrogen, formyl, C₁₋₆alkylcarbonyl, Hetcarbonyl, pyrrolidinyl, piperidinyl, homopiperidinyl, C₃₋₇cycloalkyl substituted with N(R⁶)₂, or C₁₋₁₀alkyl substituted with N(R⁶)₂ and optionally with a second, third or fourth substituent selected from amino, hydroxy, C₃₋₇cycloalkyl, C₂₋₅alkanediyl, piperidinyl, mono-or di(C₁₋₆alkyl)amino, C₁₋₆alkyloxycarbonylamino, aryl and aryloxy;

R³ is hydrogen, hydroxy, C₁₋₆alkyl, C₁₋₆alkyloxy, arylC₁₋₆alkyl or arylC₁₋₆alkyloxy;

R⁴ is hydrogen, C₁₋₆alkyl or arylC₁₋₆alkyl;

R^{5a}, R^{5b}, R^{5c} and R^{5d} each independently are hydrogen or C₁₋₆alkyl; or

R^{5a} and R^{5b}, or R^{5c} and R^{5d} taken together form a bivalent radical of formula -(CH₂)_s-

15 wherein s is 4 or 5;

R⁶ is hydrogen, C₁₋₄alkyl, formyl, hydroxyC₁₋₆alkyl, C₁₋₆alkylcarbonyl or C₁₋₆alkyloxycarbonyl;

aryl is phenyl or phenyl substituted with 1 or more, such as 2, 3 or 4, substituents selected from halo, hydroxy, C₁₋₆alkyl, hydroxyC₁₋₆alkyl, polyhaloC₁₋₆alkyl, and C₁₋₆alkyloxy;

20 ₆alkyloxy;

Het is pyridyl, pyrimidinyl, pyrazinyl, pyridazinyl.

2. (amended) A compound according to claim 1, wherein -a¹=a²-a³=a⁴- is a radical of formula (a-1) or (a-2).

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3. (amended) A compound according to claim 1 [or 2] wherein R¹ is phenyl optionally substituted with halo, C₁₋₆alkyl or C₁₋₄alkyloxy; or pyridyl optionally substituted with 1 or more substituents selected from arylC₁₋₆alkyloxy, C₁₋₆alkyloxyC₁₋₆alkyl, aryl, mono-or di(C₁₋₆alkyl)amino, C(=O)-NR^{5c}R^{5d}, halo or C₁₋₆alkyl.

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4. (amended) A compound according to [any one of] claim 1, [claims 1 to 3] wherein G is C₁₋₄alkanediyl substituted with hydroxy, C₁₋₆alkyloxy, HO(-CH₂-CH₂-O)_n-, C₁₋₆alkyloxy(-CH₂-CH₂-O)_n- or arylC₁₋₆alkyloxy(-CH₂-CH₂-O)_n-.
5. (amended) A compound according to [any one of] claim 1, [claims 1 to 4] wherein Q is a radical of formula (b-5) wherein v is 2 and Y¹ is -NR²-.
6. (amended) A compound according to [any one of] claim 1, [claims 1 to 5] wherein X¹ is NH or CH₂.
7. (amended) A compound according to [any one of] claim 1, [claims 1 to 6] wherein R² is hydrogen or C₁₋₁₀alkyl substituted with NHR⁶ wherein R⁶ is hydrogen or C₁₋₆alkyloxycarbonyl.
8. A compound according to claim 1 wherein the compound is [(A),(S)]-N-[1-(2-amino-3-methylbutyl)-4-piperidinyl]-1-[(6-bromo-2-pyridinyl)ethoxymethyl]-1H-benzimidazol-2-amine; [(A),(S)]-N-[1-(2-aminopropyl)-4-piperidinyl]-1-[ethoxy(6-methyl-2-pyridinyl)methyl]-1H-benzimidazol-2-amine (compound 75); (±)-N-[1-(2-amino-3-methylbutyl)-4-piperidinyl]-1-[(2-methoxyethoxy)(6-methyl-2-pyridinyl)methyl]-1H-benzimidazol-2-amine; N-[1-(2-amino-3-methylbutyl)-4-piperidinyl]-6-chloro-1-[(2-methoxyethoxy)(6-methyl-2-pyridinyl)methyl]-4-methyl-1H-benzimidazol-2-amine trihydrochloride trihydrate; [(A),(R)]-N-[1-(2-amino-3-methylbutyl)-4-piperidinyl]-1-[ethoxy(6-methyl-2-pyridinyl)methyl]-1H-benzimidazol-2-amine monohydrate; (±)-N-[1-(2-aminopropyl)-4-piperidinyl]-1-[ethoxy(6-methyl-2-pyridinyl)methyl]-1H-benzimidazol-2-amine; [(A),(S)]-N-[1-(2-amino-3-methylbutyl)-4-piperidinyl]-1-[ethoxy(6-methyl-2-pyridinyl)methyl]-1H-benzimidazol-2-amine monohydrate; (±)-N-[1-(2-amino-3-methylbutyl)-4-piperidinyl]-1-[ethoxy(6-methyl-2-pyridinyl)methyl]-1H-benzimidazol-2-amine; [(A),(R)]-N-[1-(2-aminopropyl)-4-piperidinyl]-1-[ethoxy(6-methyl-2-pyridinyl)methyl]-1H-benzimidazol-2-amine monohydrate; (±)-N-[1-(2-

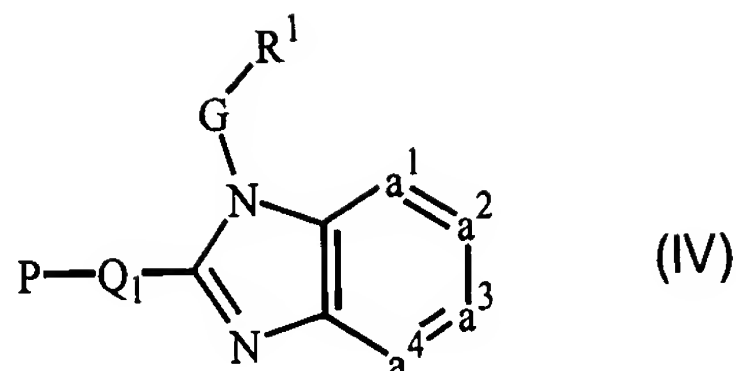
aminoethyl)-4-piperidinyl]-1-[(6-bromo-2-pyridinyl)ethoxymethyl]-2-benzimidazol-2-amine; (±)-N-[1-(2-aminoethyl)-4-piperidinyl]-1-[(2-ethoxyethoxy)(6-methyl-2-pyridinyl)methyl]-1H-benzimidazol-2-amine; [(B),(S)] N-[1-(2-aminopropyl)-4-piperidinyl]-1-[ethoxy(6-methyl-2-pyridinyl)methyl]-1H-benzimidazol-2-amine monohydrate; (±)-N-[1-(2-amino-3-methylbutyl)-4-piperidinyl]-3-[(2-methoxyethoxy)(6-methyl-2-pyridinyl)methyl]-7-methyl-3H-imidazo[4,5-b]pyridin-2-amine; (±)-N-[1-(2-amino-3-methylbutyl)-4-piperidinyl]-1-[(2-ethoxyethoxy)(6-phenyl-2-pyridinyl)methyl]-1H-benzimidazol-2-amine; (±)-N-[1-(2-aminoethyl)-4-piperidinyl]-1-[(2-methoxyethoxy)(6-methyl-2-pyridinyl)methyl]-1H-benzimidazol-2-amine; (±)-N-[1-(2-amino-3-methylbutyl)-4-piperidinyl]-1-[(6-bromo-2-pyridinyl)ethoxymethyl]-4-methyl-1H-benzimidazol-2-amine monohydrate; [(A),(R)]-N-[1-(2-amino-3-methylbutyl)-4-piperidinyl]-1-[(6-bromo-2-pyridinyl)ethoxymethyl]-1H-benzimidazol-2-amine; (±)-N-[1-(2-amino-3-methylbutyl)-4-piperidinyl]-1-[(6-bromo-2-pyridinyl)ethoxymethyl]-1H-benzimidazol-2-amine; a prodrug, N-oxide, addition salt, quaternary amine, metal complex or stereochemically isomeric form thereof.

9. (amended) [A compound] A method of using as a medicine a compound as claimed in any one of claims 1 to 8 [for use as a medicine].

10. (amended) A pharmaceutical composition, comprising a pharmaceutically acceptable carrier, and as active ingredient a therapeutically effective amount of a compound as [described] claimed in any one of claims 1 to 8.

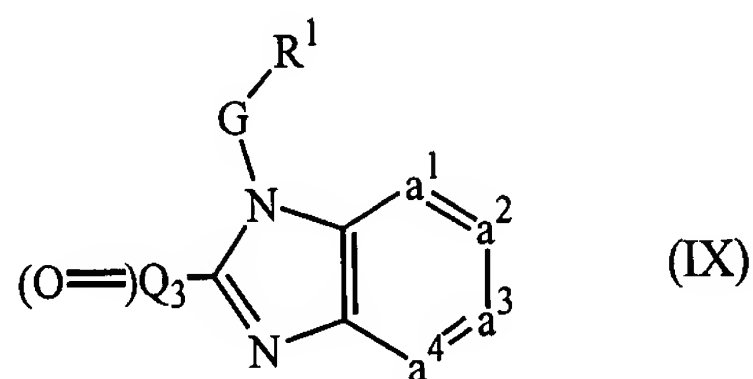
11. (amended) A process of preparing a composition as claimed in claim 10, [characterized in that,] comprising the step of intimately mixing said carrier with said compound [a pharmaceutically acceptable carrier is intimately mixed with a therapeutically effective amount of a compound as described in any one of claims 1 to 8].

12. An intermediate of formula



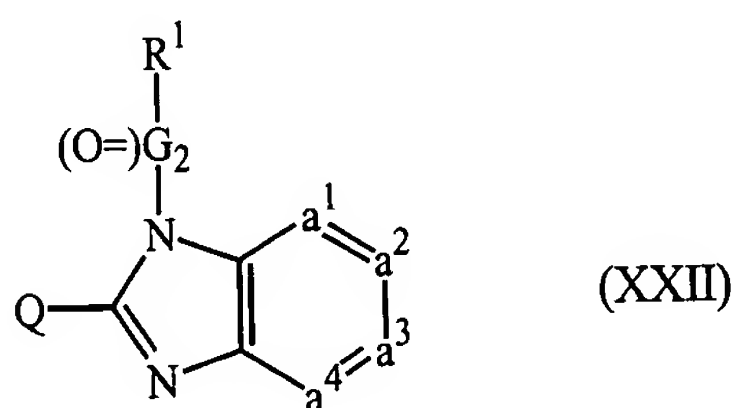
with R^1 , G and $-a^1=a^2-a^3=a^4-$ defined as in claim 1, P being a protective group, and Q_1 being defined as Q according to claim 1 provided that it is devoided of the R^2 or R^6 substituent.

13. An intermediate of formula



with R^1 , G and $-a^1=a^2-a^3=a^4-$ defined as in claim 1, and $(O=)Q_3$ being a carbonyl derivative of Q, said Q being defined according to claim 1, provided that it is devoided of the $-NR^2R^4$ or $-NR^2-$ substituent.

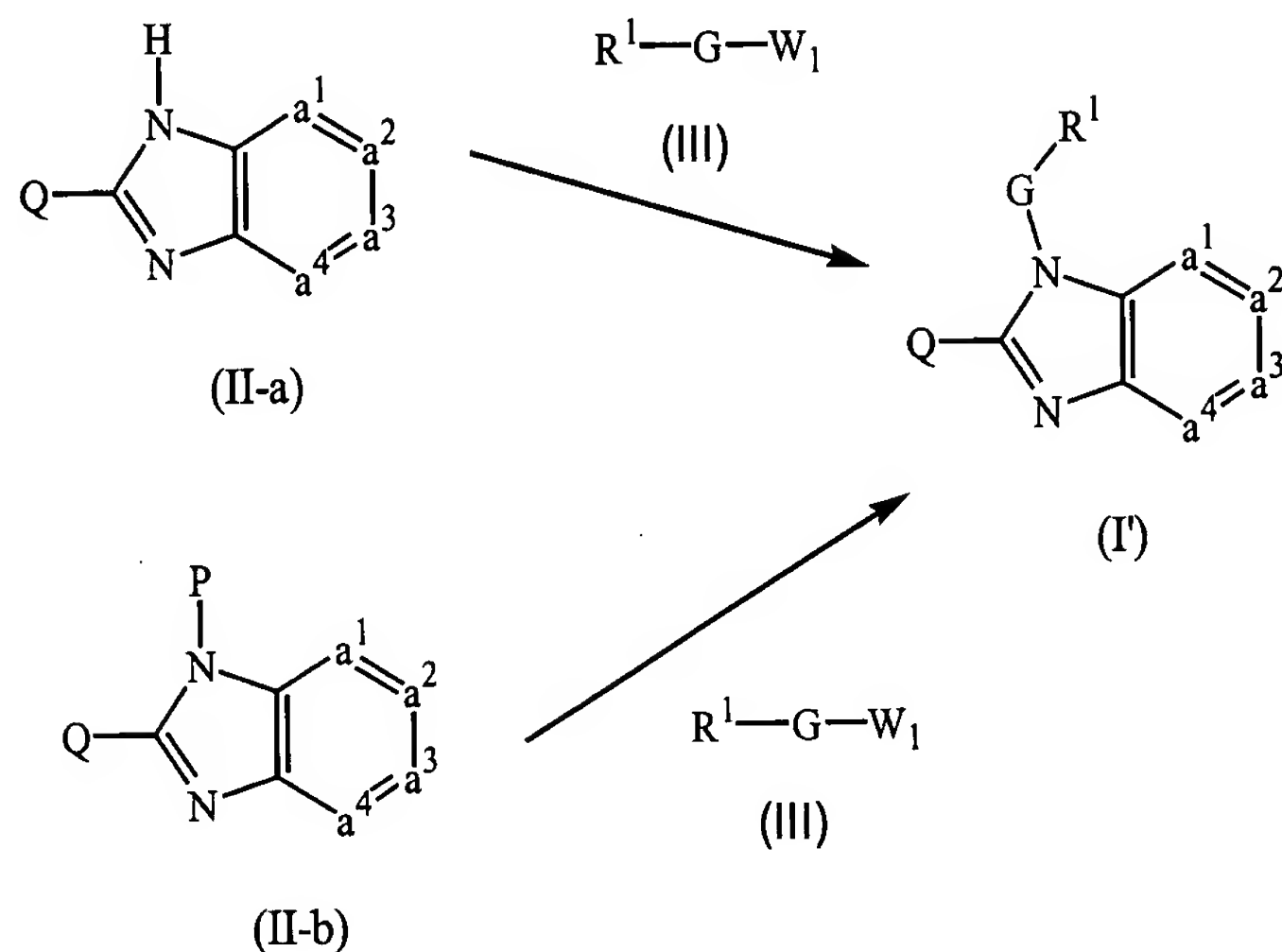
14. An intermediate of formula



with R^1 , Q and $-a^1=a^2-a^3=a^4-$ defined as in claim 1, and $(O=)G_2$ being a carbonyl derivative of G, said G being defined according to claim 1.

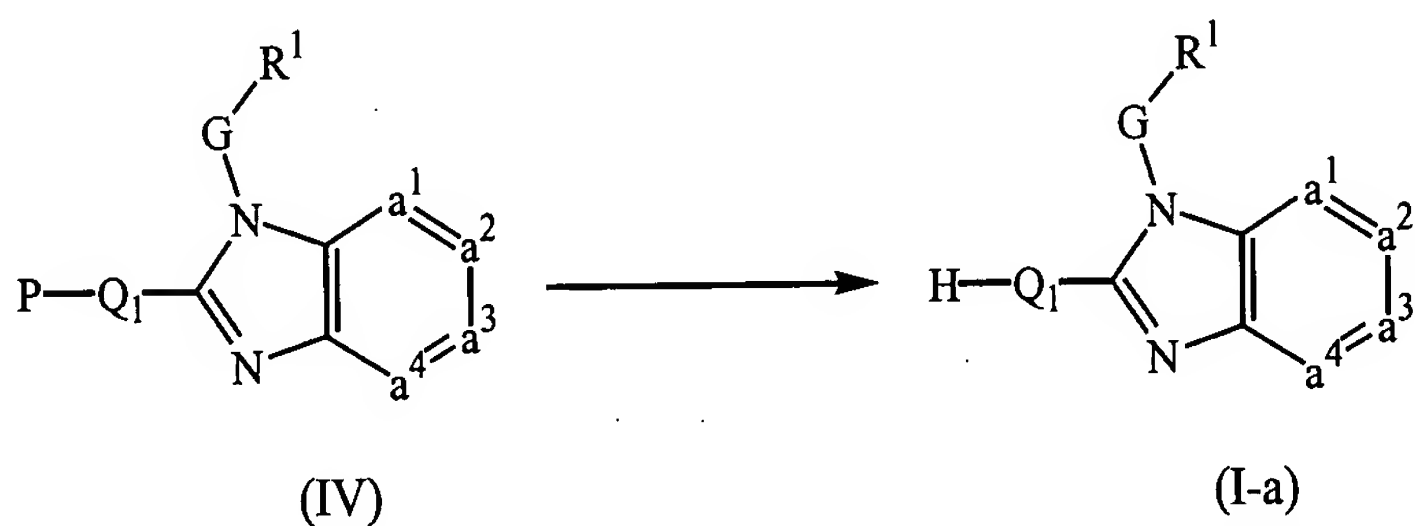
15. (amended) A process of preparing a compound as claimed in claim 1, [characterized by,] comprising at least one step selected from the group consisting of:

- a) reacting an intermediate of formula (II-a) or (II-b) with an intermediate of formula (III)



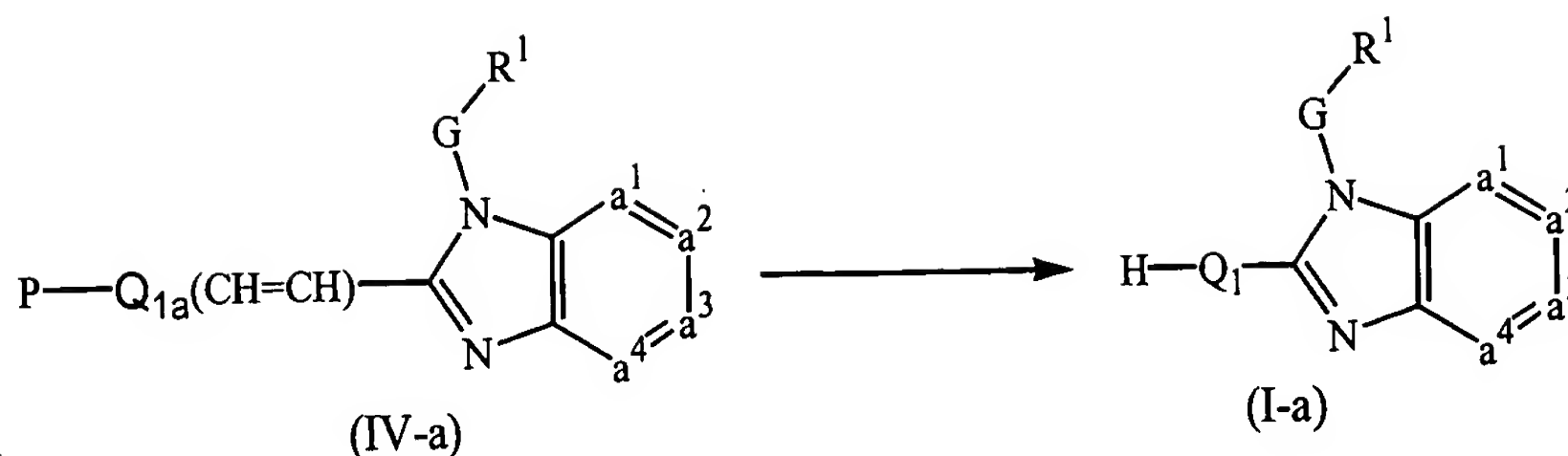
with R^1 , G, Q and $-a^1=a^2-a^3=a^4-$ defined as in claim 1, and W_1 being a suitable leaving group, in the presence of a suitable base and in a suitable reaction-inert solvent;

- b) deprotecting an intermediate of formula (IV)



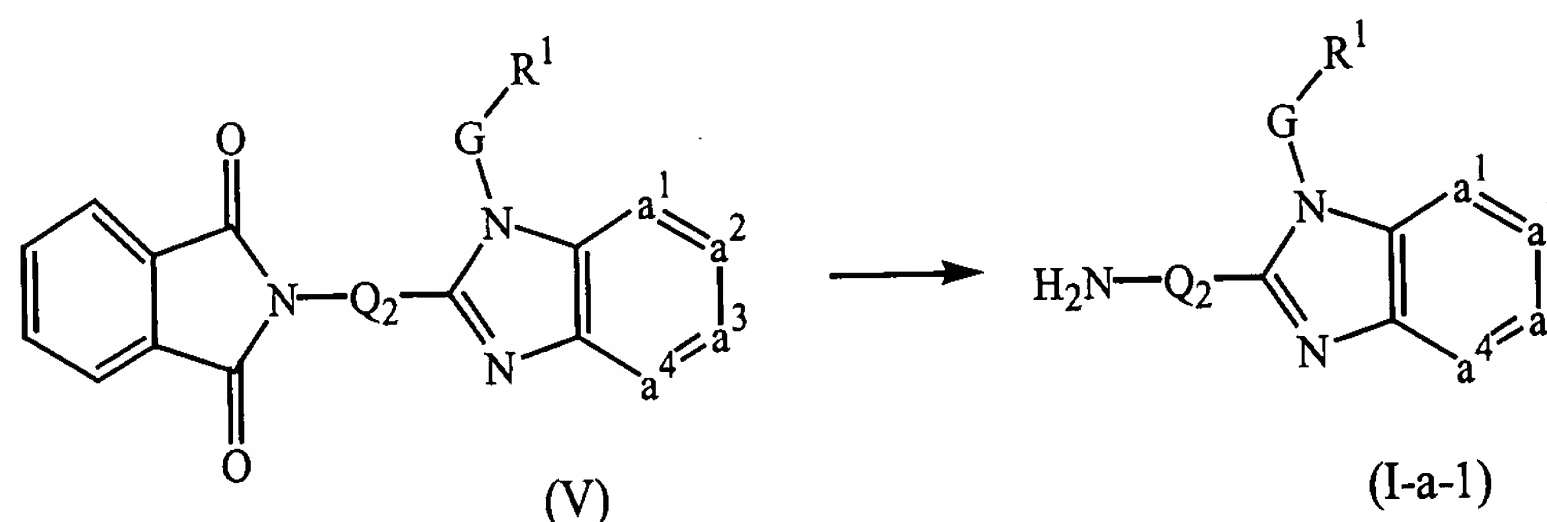
with R^1 , G, and $-a^1=a^2-a^3=a^4-$ defined as in claim 1, H-Q₁ being defined as Q according to claim 1 provided that R^2 or at least one R^6 substituent is hydrogen, and P being a protective group;

- c) deprotecting and reducing an intermediate of formula (IV-a)



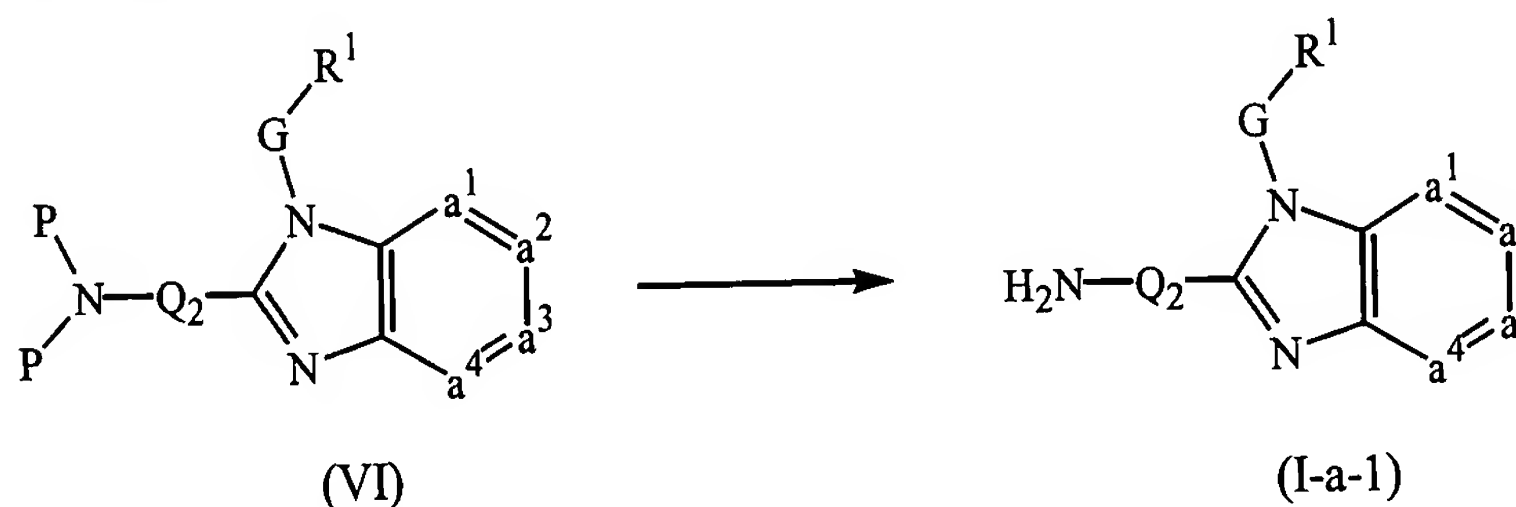
with R^1 , G, and $-a^1=a^2-a^3=a^4-$ defined as in claim 1, H-Q₁ being defined as Q according to claim 1 provided that R^2 or at least one R^6 substituent is hydrogen, Q_{1a}(CH=CH) being defined as Q₁ provided that Q₁ comprises an unsaturated bond, and P being a protective group;

d) deprotecting an intermediate of formula (V)



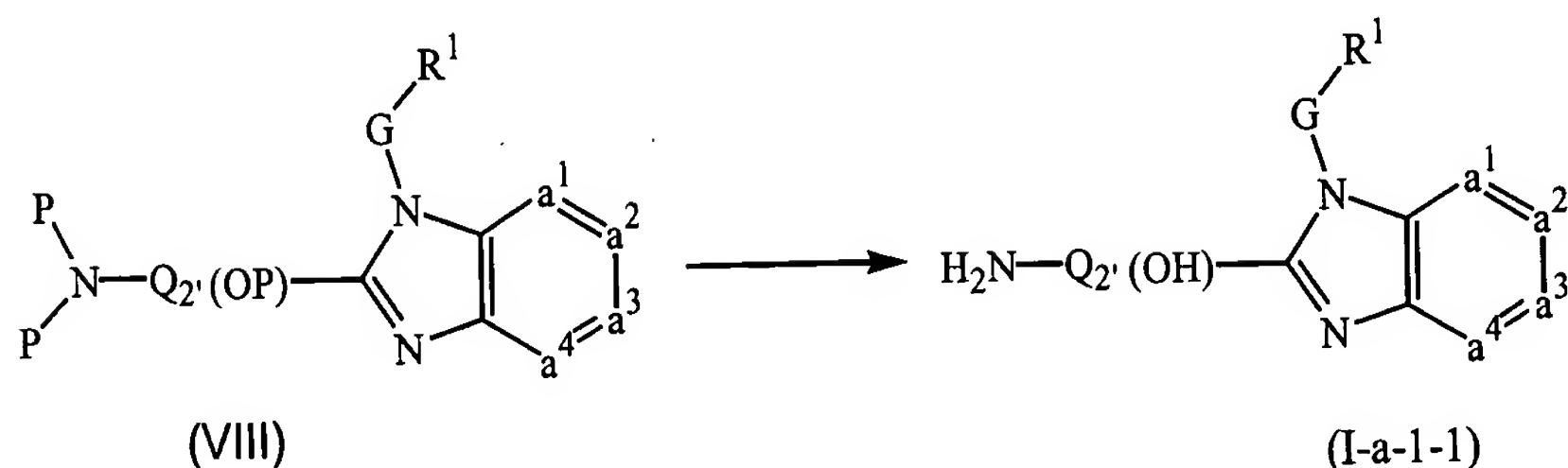
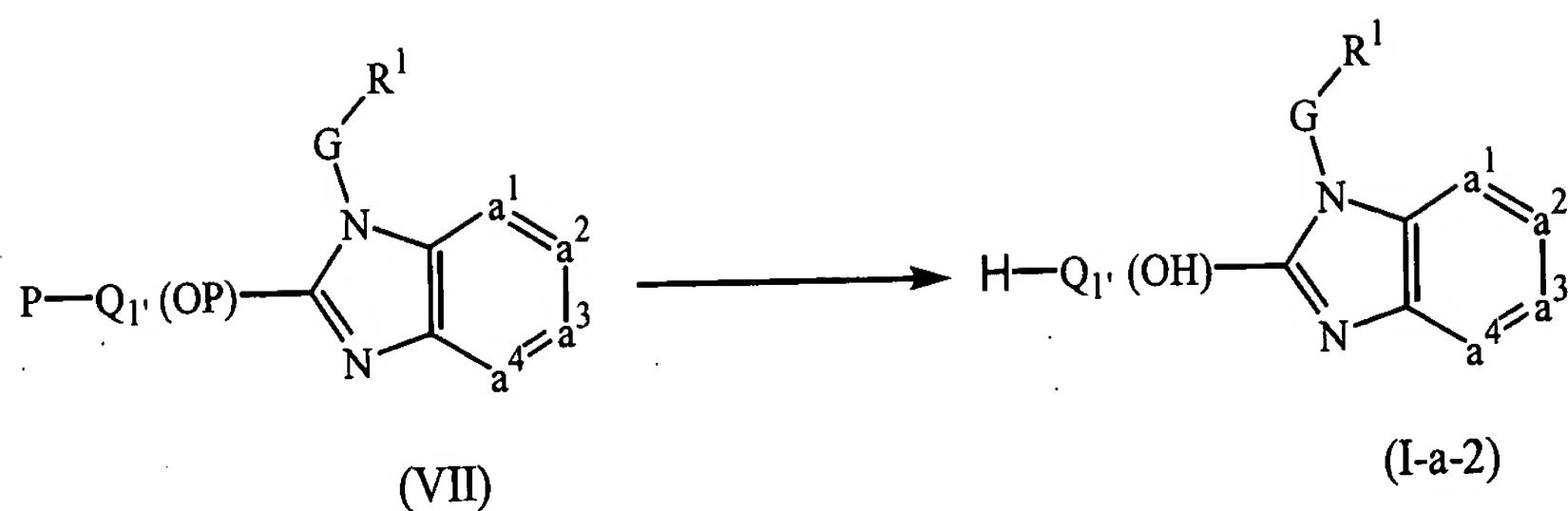
with R^1 , G, and $-a^1=a^2-a^3=a^4-$ defined as in claim 1, and H₂N-Q₂ being defined as Q according to claim 1 provided that both R^6 substituents are hydrogen or R^2 and R^4 are both hydrogen;

e) deprotecting an intermediate of formula (VI)



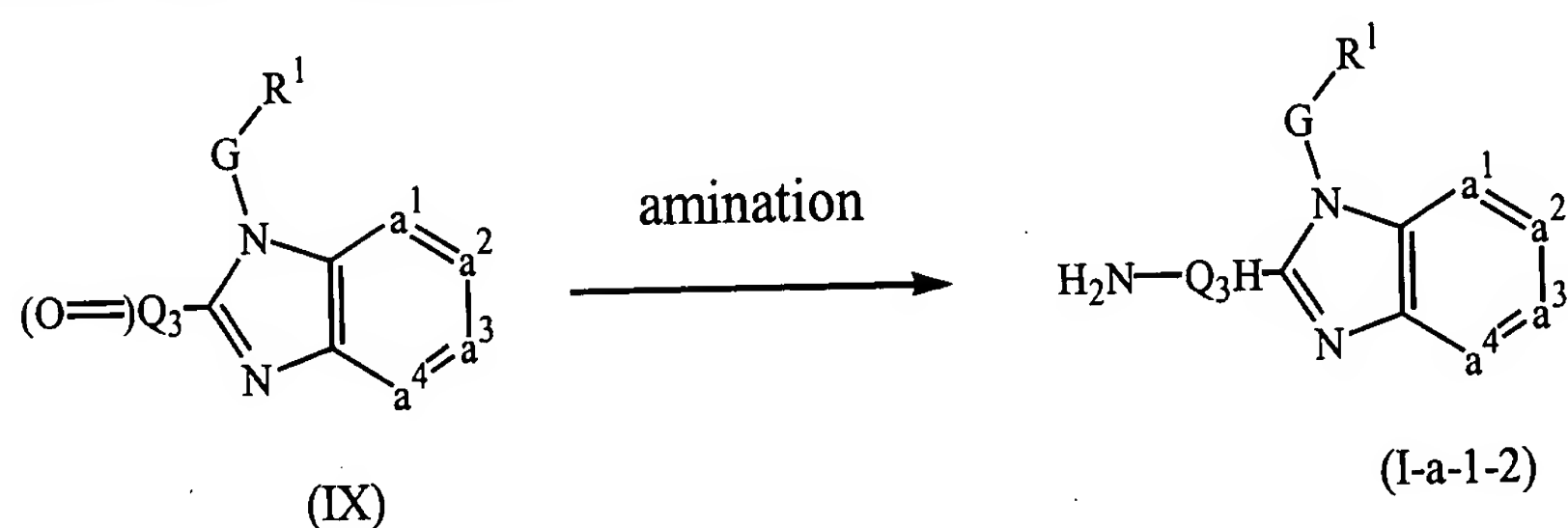
with R^1 , G, and $-a^1=a^2-a^3=a^4-$ defined as in claim 1, and H₂N-Q₂ being defined as Q according to claim 1 provided that both R^6 substituents are hydrogen or R^2 and R^4 are both hydrogen, and P being a protective group;

f) deprotecting an intermediate of formula (VII) or (VIII)



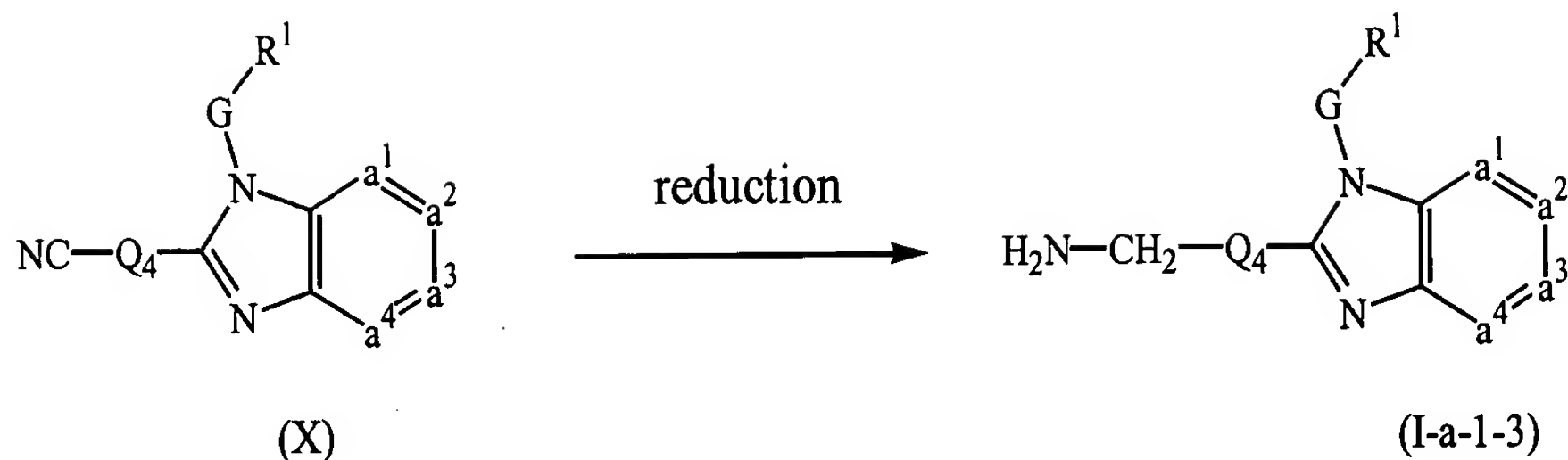
with R^1 , G , and $-a^1=a^2-a^3=a^4-$ defined as in claim 1, $H-Q_1'(OH)$ being defined as Q according to claim 1 provided that R^2 or at least one R^6 substituent is hydrogen and provided that Q comprises a hydroxy moiety, $H_2N-Q_2'(OH)$ being defined as Q according to claim 1 provided that both R^6 substituents are hydrogen or R^2 and R^4 are both hydrogen and provided that Q comprises a hydroxy moiety, and P being a protective group;

g) amination of an intermediate of formula (IX)



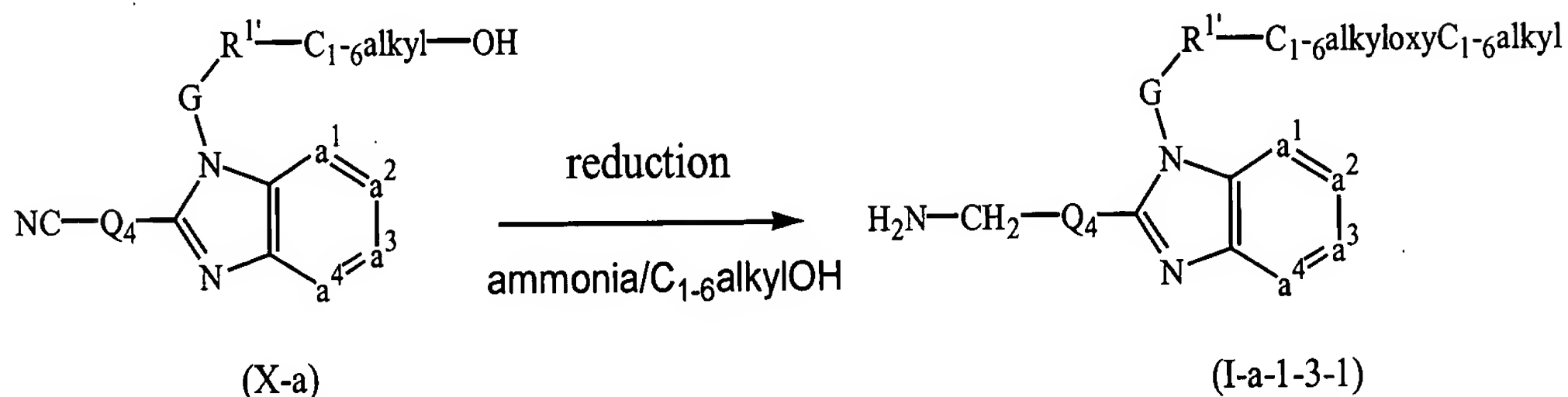
with R^1 , G , and $-a^1=a^2-a^3=a^4-$ defined as in claim 1, and H_2N-Q_3H being defined as Q according to claim 1 provided that both R^6 substituents are hydrogen or R^2 and R^4 are both hydrogen, and the carbon adjacent to the nitrogen carrying the R^6 , or R^2 and R^4 substituents contains at least one hydrogen, in the presence of a suitable amination reagent;

h) reducing an intermediate of formula (X)



with R^1 , G, and $-a^1=a^2-a^3=a^4-$ defined as in claim 1, and $H_2N-CH_2-Q_4$ being defined as Q according to claim 1 provided that Q comprises a $-CH_2-NH_2$ moiety, in the presence of a suitable reducing agent;

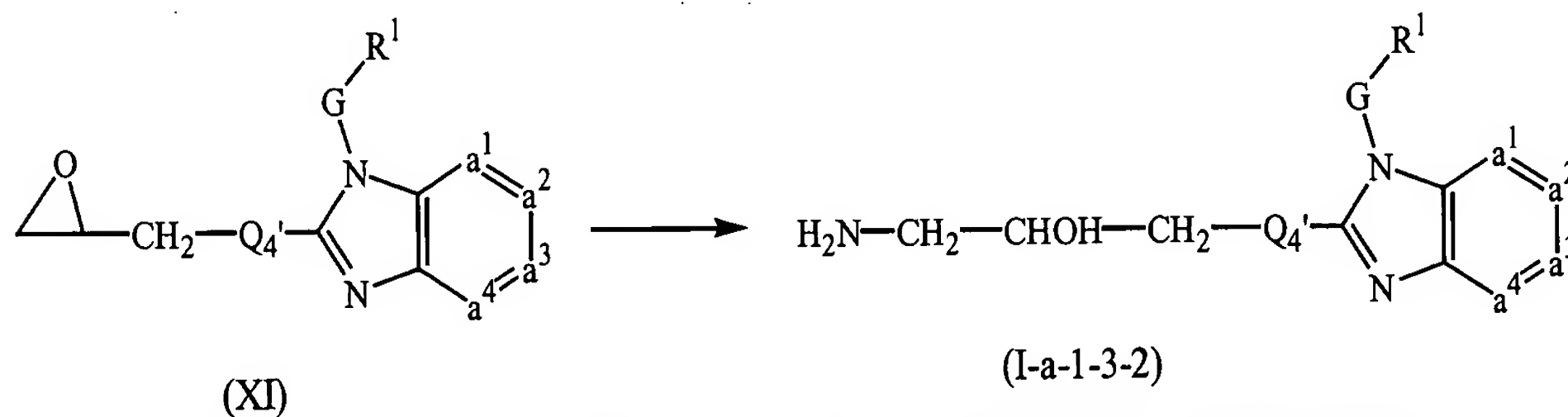
- 5 i) reducing an intermediate of formula (X-a)



with G, and $-a^1=a^2-a^3=a^4-$ defined as in claim 1, $H_2N-CH_2-Q_4$ being defined as Q according to claim 1 provided that Q comprises a $-CH_2-NH_2$ moiety, and $R^{1'}$ being defined as R^1 according to claim 1 provided that it comprises at least one substituent, in the presence of a suitable reducing agent and suitable solvent;

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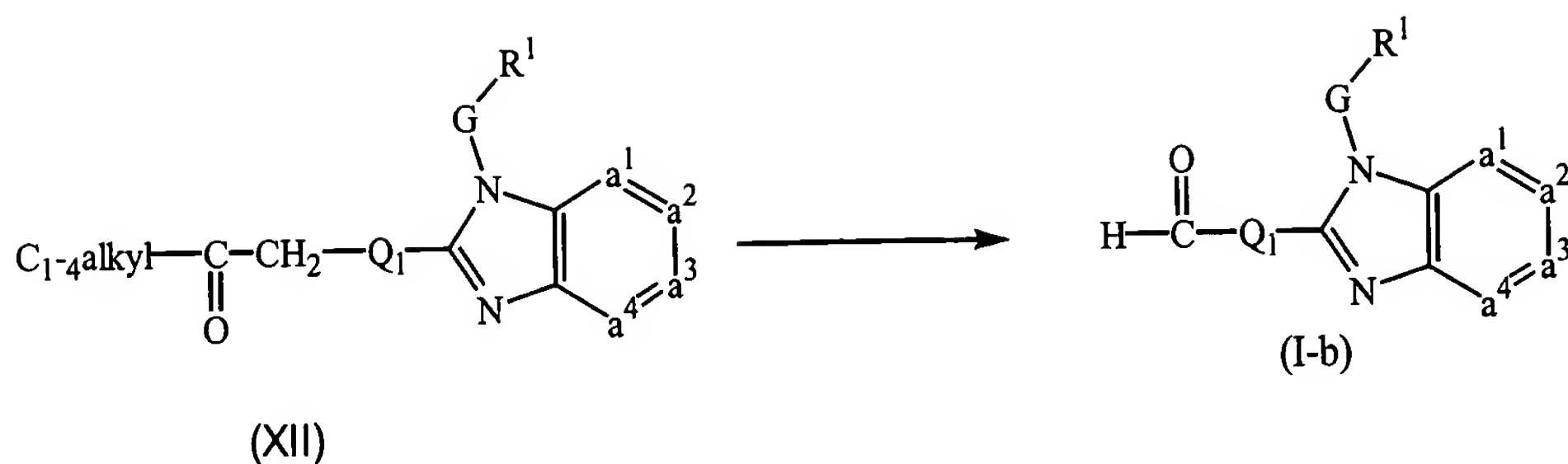
- j) amination of an intermediate of formula (XI)



with R^1 , G, and $-a^1=a^2-a^3=a^4-$ defined as in claim 1, and $H_2N-CH_2-CHOH-CH_2-Q_4'$ being defined as Q according to claim 1 provided that Q comprises a $CH_2-CHOH-CH_2-NH_2$ moiety, in the presence of a suitable amination reagent;

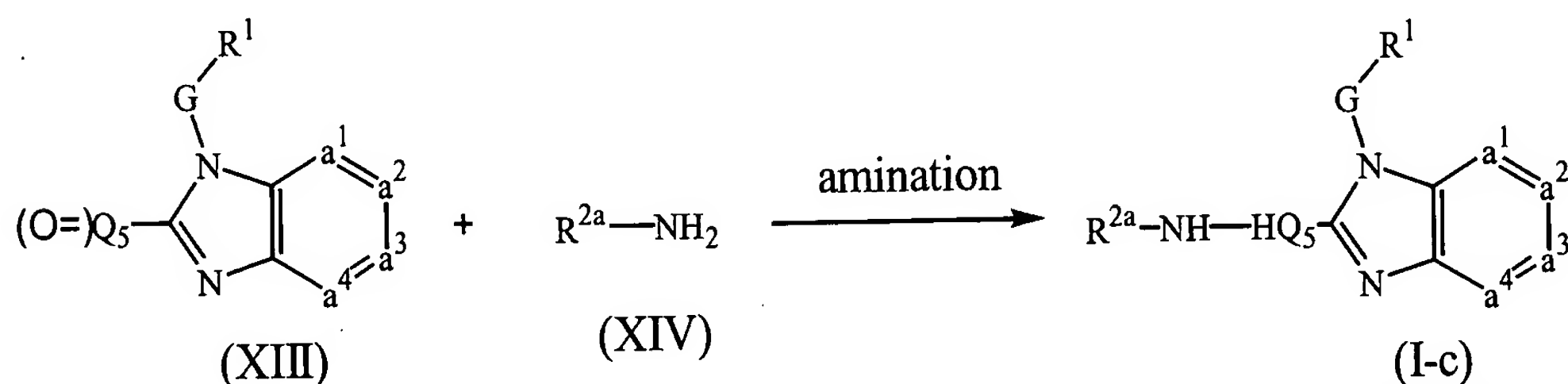
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- k) reacting an intermediate of formula (XII) with formic acid, formamide and ammonia



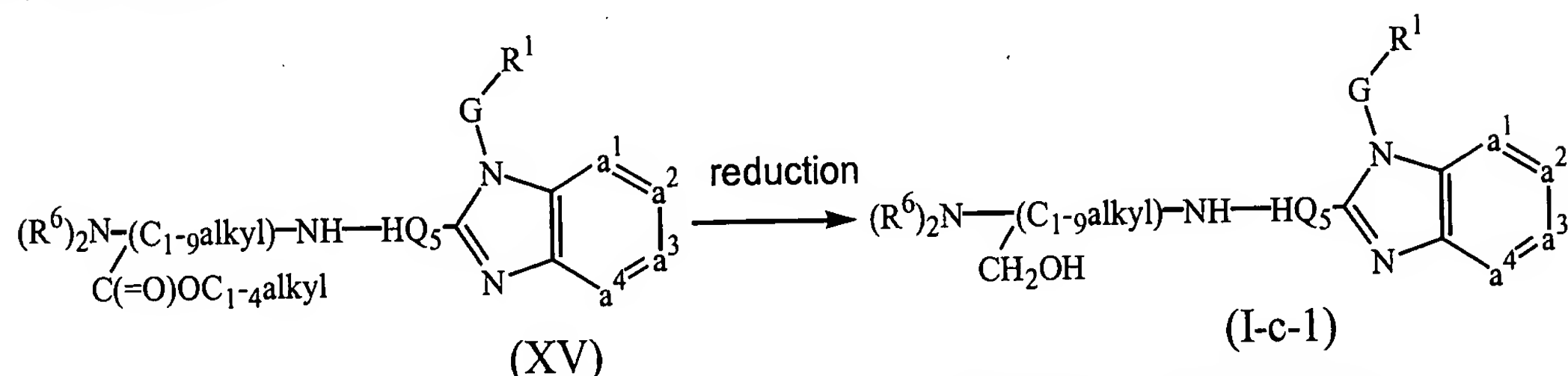
with R^1 , G, and $-\text{a}^1=\text{a}^2-\text{a}^3=\text{a}^4-$ defined as in claim 1, and $\text{H}-\text{C}(=\text{O})-\text{Q}_1$ being defined as Q according to claim 1 provided that R^2 or at least one R^6 substituent is formyl;

- l) amination of an intermediate of formula (XIII) by reaction with an intermediate of formula (XIV)



with R^1 , G, and $-\text{a}^1=\text{a}^2-\text{a}^3=\text{a}^4-$ defined as in claim 1, and $\text{R}^{2a}-\text{NH}-\text{HQ}_5$ being defined as Q according to claim 1 provided that R^2 is other than hydrogen and is represented by R^{2a} , R^4 is hydrogen, and the carbon atom adjacent to the nitrogen atom carrying the R^2 and R^4 substituents, carries also at least one hydrogen atom, in the presence of a suitable reducing agent;

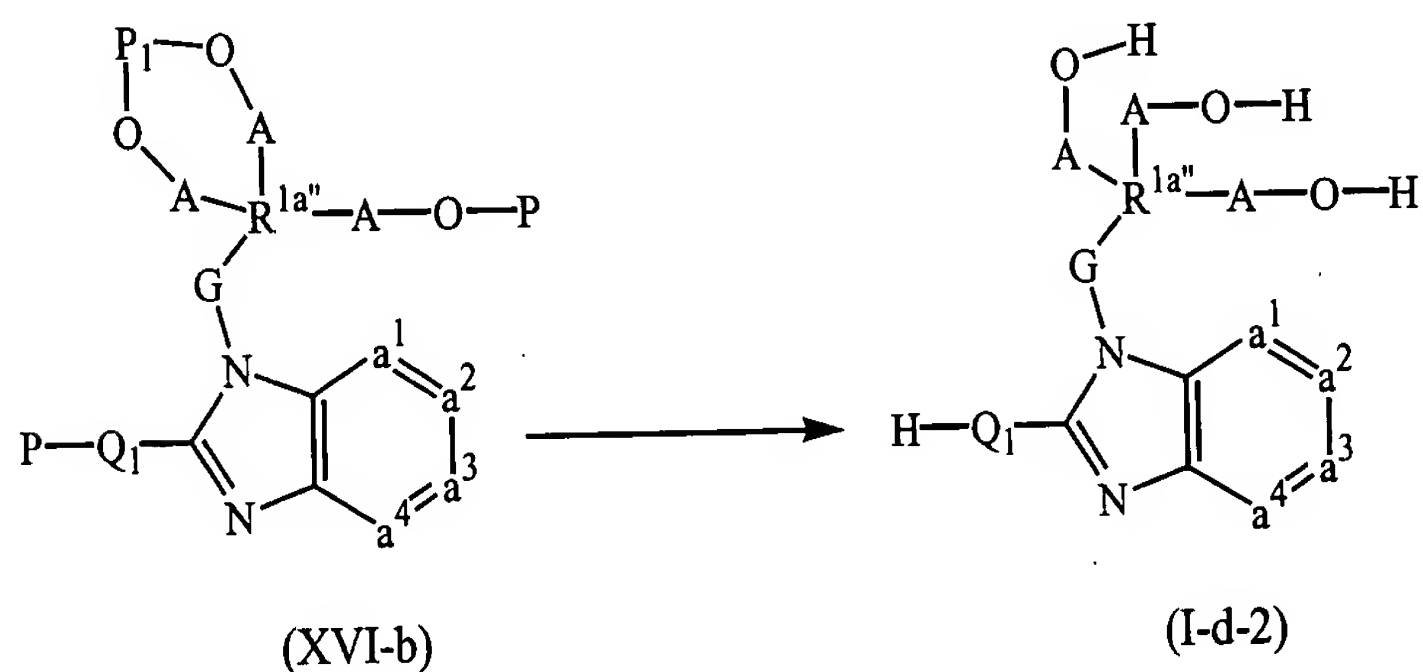
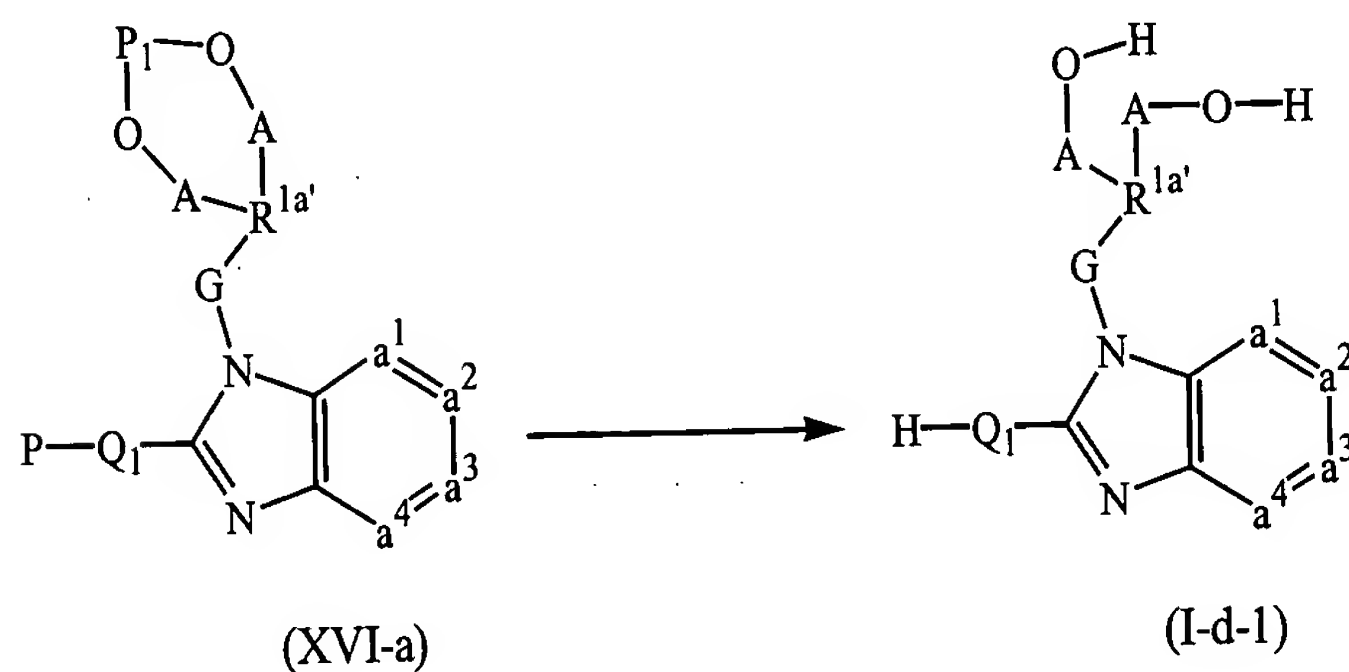
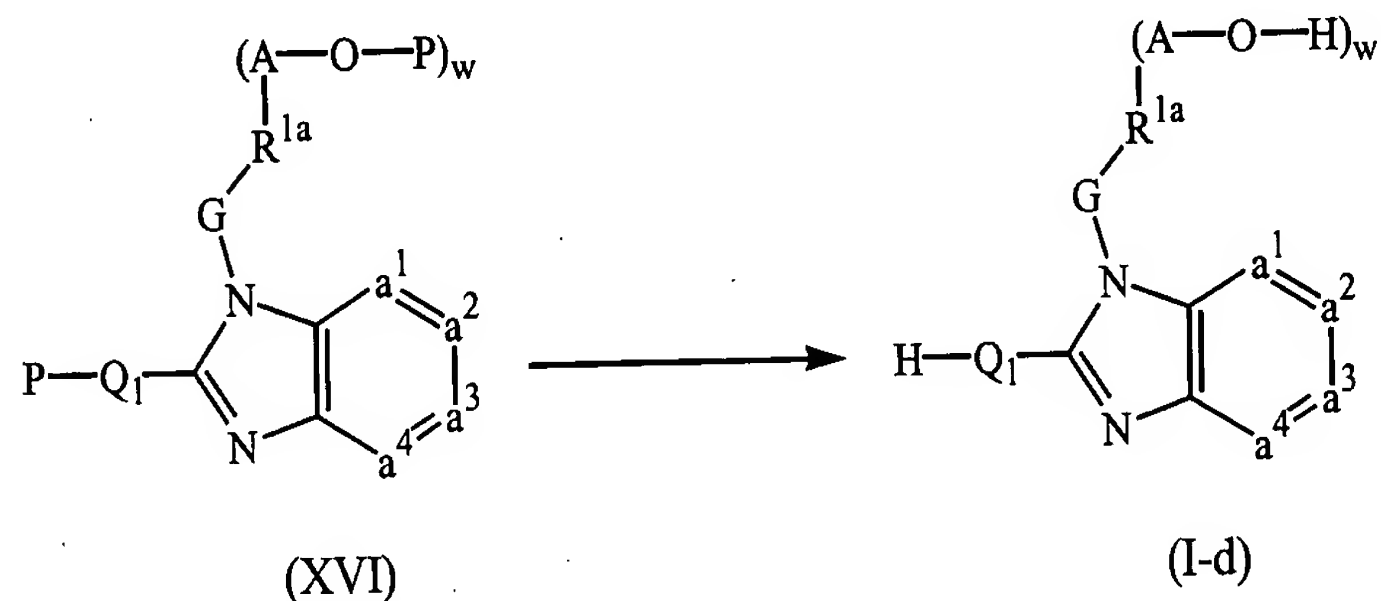
- m) reducing an intermediate of formula (XV)



with R^1 , G, and $-\text{a}^1=\text{a}^2-\text{a}^3=\text{a}^4-$ defined as in claim 1, and $(\text{R}^6)_2\text{N}-(\text{C}_{1-9}\text{alkyl})-\text{CH}_2\text{OH}-\text{NH}-\text{HQ}_5$ being defined as Q according to claim 1 provided that R^2 is other than hydrogen and is represented by $\text{C}_{1-10}\text{alkyl}$ substituted with $\text{N}(\text{R}_6)_2$ and with hydroxy,

and the carbon atom carrying the hydroxy, carries also two hydrogen atoms, and provided that R^4 is hydrogen, and the carbon atom adjacent to the nitrogen atom carrying the R^2 and R^4 substituents, carries also at least one hydrogen atom, with a suitable reducing agent;

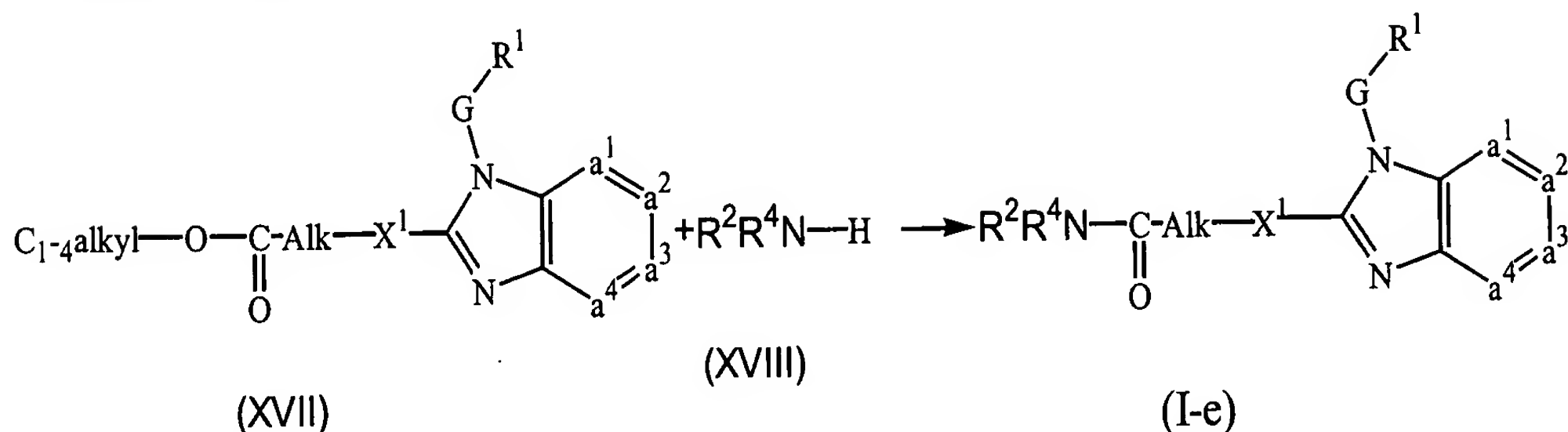
- 5 n) deprotecting an intermediate of formula (XVI), (XVI-a) or (XVI-b)



with G, and $-a^1=a^2-a^3=a^4-$ defined as in claim 1, and $H-Q_1$ being defined as Q according to claim 1 provided that R^2 or at least one R^6 substituent is hydrogen, and $R^{1a}-(A-O-H)_w$, $R^{1a'}-(A-O-H)_2$ and $R^{1a''}-(A-O-H)_3$ being defined as R^1 according to claim 1 provided that R^1 is substituted with hydroxy, hydroxy C_{1-6} alkyl, or $HO(-CH_2-CH_2-O)_n-$,

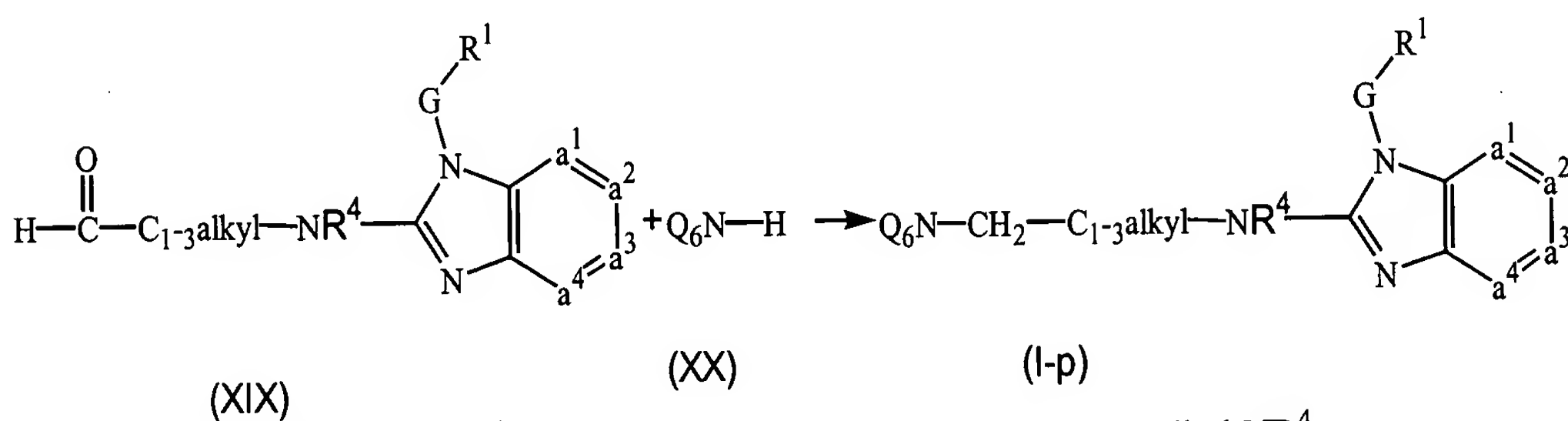
with w being an integer from 1 to 4 and P or P₁ being a suitable protecting group, with a suitable acid[.];

o) amination of an intermediate of formula (XVII)



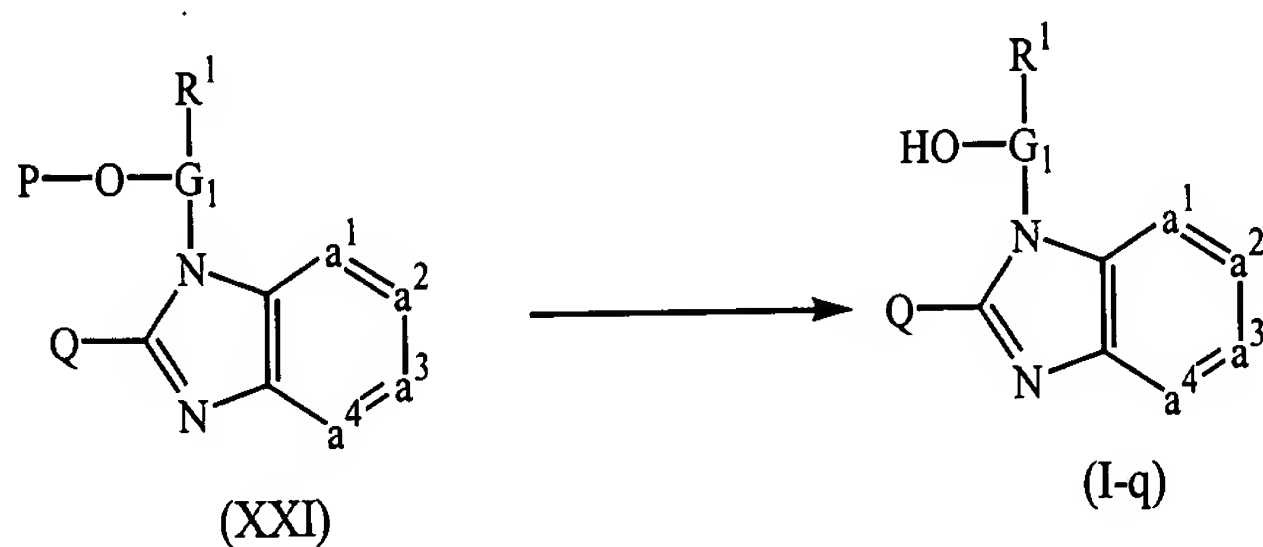
5 with R¹, G, -a¹=a²-a³=a⁴-, Alk, X¹ R² and R⁴ defined as in claim 1, in the presence of a suitable amination agent;

p) amination of an intermediate of formula (XIX)



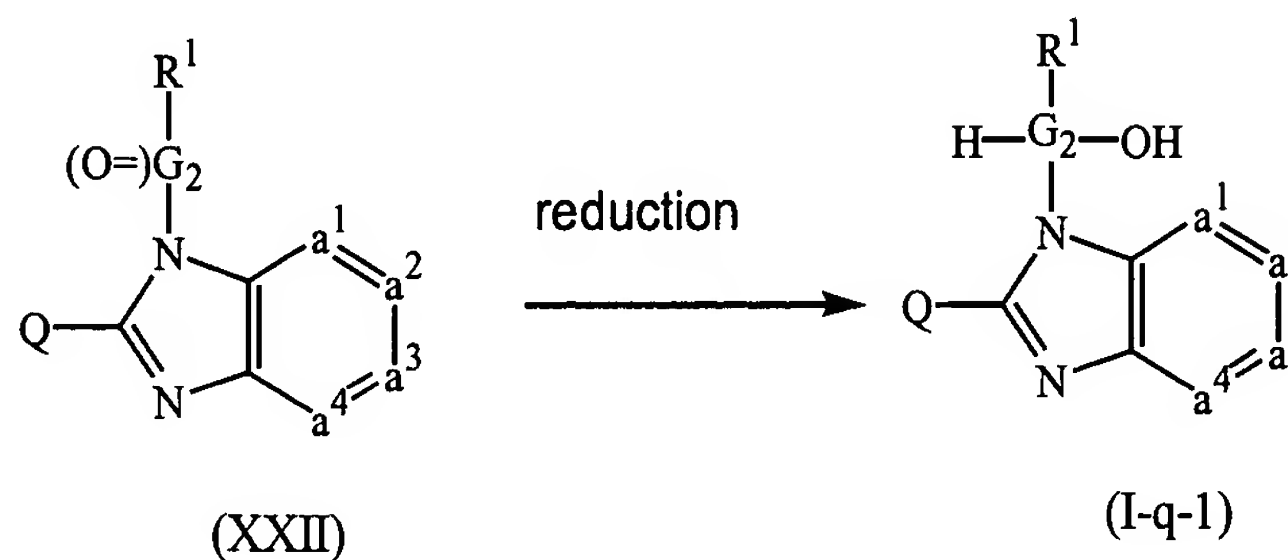
10 with R¹, G, and -a¹=a²-a³=a⁴- defined as in claim 1, and Q₆N-CH₂-C₁₋₃alkyl-NR⁴ being defined as Q according to claim 1 provided that in the definition of Q, X² is C₂₋₄alkyl-NR⁴, in the presence of a suitable amination agent;

q) deprotecting an intermediate of formula (XXI)



with R^1 , Q, and $-a^1=a^2-a^3=a^4-$ defined as in claim 1, and $HO-G_1$ being defined as G according to claim 1 provided that G is substituted with hydroxy or $HO-(CH_2CH_2O)_n$; and

r) reducing an intermediate of formula (XXII)



with R^1 , Q, and $-a^1=a^2-a^3=a^4-$ defined as in claim 1, and $H-G_2-OH$ being defined as G according to claim 1 provided that G is substituted with hydroxy and the carbon atom carrying the hydroxy substituent carries also at least one hydrogen, in the presence of a suitable reducing agent.

[and, if desired, converting compounds of formula (I) into each other following art-known transformations, and further, if desired, converting the compounds of formula (I), into a therapeutically active non-toxic acid addition salt by treatment with an acid, or into a therapeutically active non-toxic base addition salt by treatment with a base, or conversely, converting the acid addition salt form into the free base by treatment with alkali, or converting the base addition salt into the free acid by treatment with acid; and, if desired, preparing stereochemically isomeric forms, metal complexes, quaternary amines or N-oxide forms thereof.]

16. (amended) A product [containing], comprising:

(c) a first compound as [defined] claimed in claim 1; and

(d) a second [another] antiviral compound, [as a combined preparation for simultaneous, separate or sequential use in the treatment or the prevention of viral infections]

wherein said first compound and said second compound are simultaneously, separately or sequentially used in the treatment or the prevention of viral infections.

17. (amended) A pharmaceutical composition, comprising:

- 5 (a) a pharmaceutically acceptable carrier; and
 (b) as active ingredients:
 i. a first compound as claimed in claim 1; and
 ii. [another] a second antiviral compound.

10 Please add the following new claims:

18. (new) The process of claim 15, further comprising the step of converting
 compound of formula (I'), stereochemically isomeric forms, metal complexes,
 quaternary amines or *N*-oxide forms thereof, into a therapeutically active non-toxic
15 acid addition salt by treatment with an acid.

19. (new) The process of claim 15, further comprising the step of converting
 compound of formula (I'), stereochemically isomeric forms, metal complexes,
 quaternary amines or *N*-oxide forms thereof, into a therapeutically active non-toxic
20 base addition salt by treatment with alkali.

20. (new) The process of claim 15, further comprising the step of converting the acid
 addition salt form of compound of formula (I'), stereochemically isomeric forms, metal
 complexes, quaternary amines or *N*-oxide forms thereof, into the free base by treatment
25 with alkali.

21. (new) The process of claim 15, further comprising the step of converting the base
 addition salt form of compound of formula (I'), stereochemically isomeric forms, metal
 complexes, quaternary amines or *N*-oxide forms thereof, into the free acid by treatment
30 with acid.